

eyes died after nine days and one month respectively and the one-eyed individual died after twenty days. These individuals were of normal size or slightly smaller.

We are likewise unable to explain the slower growth of the surviving individual whose weight in proportion to its length has been normal throughout (Figure 1). There would appear to be deleterious side effects to blindness quite apart from the inability of such individuals to emerge from the eggs unaided.

We consider the reason for keeping a foot or the tip of the tail in the water when it hauled out on the pool perimeter was to guide

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it back to the water since experiments indicated that once removed from the immediate vicinity of the pool it could relocate it only by trial and error movements.

#### ACKNOWLEDGEMENTS

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#### 21. TRAP USED FOR CATCHING A MUGGER (*CROCODYLUS PALUSTRIS*) FROM NATURE

(With three text-figures)

##### INTRODUCTION

Between 1977 and 1979, during the breeding season, a female mugger of the Satkoshia Gorge, River Mahanadi, Orissa showed strong sexual attraction towards captive males at the Gharial Research and Conservation Unit (GRACU) which is situated on the banks of the river. On 31 Jan. 1979, the mugger was sighted near the mugger enclosure of GRACU

at mid-night. She was surrounded from all sides with suitable strawed-bamboo mat covers, and then skilfully directed into the mugger enclosure. On August 4, 1980 she broke through the wiremesh wall of the enclosure and returned back to the river. Data collected to this stage have been reported earlier in Singh 1979 and Singh (in press).

During 1980 post-monsoon she again displayed a behaviour suggesting her intention

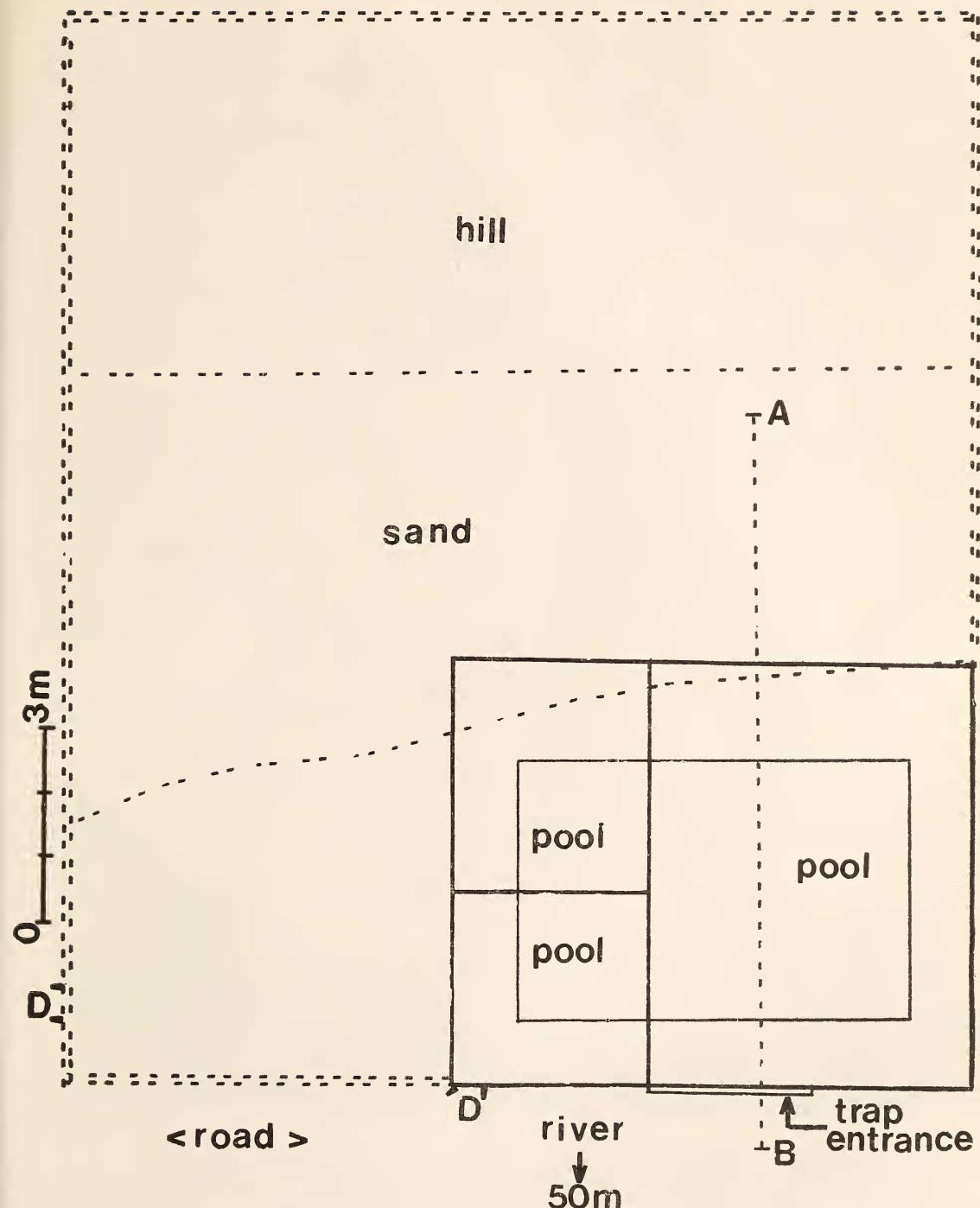


Fig. 1. Ground plan of the Mugger enclosure at GRACU, over which the trap was designed to catch the female mugger from nature. AB, plane through which section have been taken for Fig. 2. D, door.

to enter into the enclosure where captive male muggers had still remained. This situation demanded the design of a trap to catch her, because waiting to see her near the enclosure and then to catch her was extremely difficult, though not impossible. Earlier experience was that when we wait for her to climb the banks and come near the enclosure, she would not do so, perhaps because she was able to detect our presence.

#### CONDITIONS OF THE TRAP

Any live trap would require a precise knowledge of the behaviour of the animal to be trapped, which was well studied in the present case. The work of trapping was facilitated because the female came near the enclosure and searched for a way into the enclosure. The males in the enclosure were the source of attraction for the female. The requirement in designing the trap, therefore, was to provide a passage into the enclosure which could not be used by those inside to come out. The other requirement was to trap the female unhurt.

#### TRAP DESIGN

The enclosure in which the male muggers were housed (Fig. 1) was of 16 x 14 m area with two small pools and one large pool. Only the pool area with near by basking areas was provided with a roof cover, the rest was open.

Over a surface of 2.5 x 1 m the lower sheet of wiremesh was removed from the front wall of the enclosure facing the river. The removed sheet was folded inside over a bamboo-frame platform, held from the roof of the enclosure by strong wire tied at two points, and supported from the bottom by strong poles. The inside edge of the platform remained hanging over the water surface of the large pool at a height of 1.5 m from water. The outer edge of the platform, now standing on the outer massony wall, 0.35 cm high, of the enclosure was provided with a gentle slope of sand levelling down to the ground. On the platform light leafy branches were spread with straw and covered with a 10 cm thick layer of earth (Fig. 2).

During February 1981 the female mugger

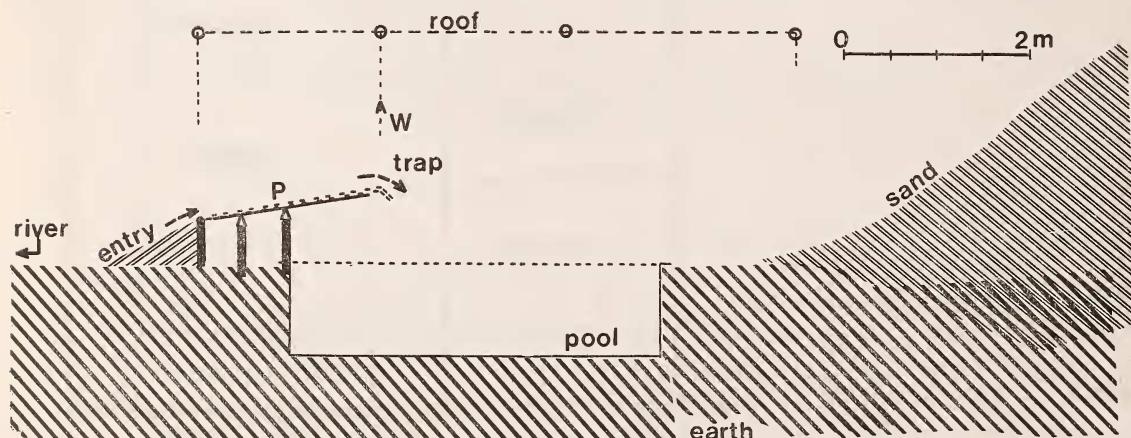


Fig. 2. Vertical section along A-B plane (Fig. 1) to show the design of the trap.  
P, platform; W, wire holding the platform to roof of the enclosure.

entered through the trap and fell into the pool, to be detected by the staff of the Unit later.

### DISCUSSION

In crocodile management catching a crocodile unhurt may be required at times. For example, situations may arise to catch a male or a female to support captive breeding, or to catch and remove a nuisance crocodile from the natural population. Live capture techniques have been described in the literature for the American Alligator (*Alligator mississippiensis*) by Chabreck (1965), Jones (1968), and Murphy and Findley (1973), and for the Saltwater Crocodile (*Crocodylus porosus*) by Webb and Messel (1977).

The live-capture technique described in the present paper was for a specific situation, where enclosures were present on the river bank, the males acted as the 'bait' and the female from nature was only searching a way into the enclosure. The requirement was to provide a one-way passage. However, the technique can be suitably modified for use in the field in catching crocodiles which come out of water being attracted towards a putrifying food bait. Such a design is made in Fig. 3 and is open for testing.

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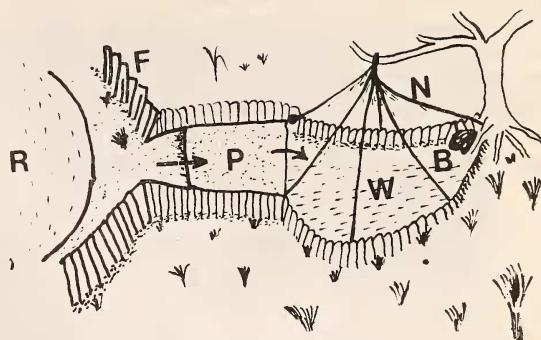


Fig. 3. Proposed design of a 'trap' to catch Mugger and Saltwater Crocodile in the wild. B, bait (e.g., food like goat intestine or any other meat); F, fence to direct the crocodile; N, a bag-like net held from the tree and spread at the bottom of the artificial pool (W). The opening into the net is fastened at W-end of P, the platform originating from the main water source.

Once the crocodile is known to have entered into the net, it can be untied from the tree and closed at its mouth fastened near P to be finally pulled out of water.

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## 22. SEXING AND SEX RATIOS OF GHARIAL (*GAVIALIS GANGETICUS*) RAISED IN CAPTIVITY

(With a plate & a text-figure)

### INTRODUCTION

Determination of the sex of individual animals and the sex ratios of populations is an important tool in the study and management of Crocodilians. A pot like 'ghara' or narial excrescence on the snout tip of adult male gharial distinguishes them from females, but otherwise sex of Crocodilians cannot be distinguished from external features. Therefore probing of the cloaca and examination of the penial/clitoral organ, hereafter referred to as the sex organ, is the only method of identifying the sex of individual crocodiles.

Whitaker *et al.* (in litt.) on the basis of cloacal probing of 20 gharial between 1 to 3 m in length state that it is difficult to sex gharial under 2 m in length. They further point out that a 2.7 m long male gharial 18 years of age had a penis only a few cm long and conclude that the sexual development of gharial is considerably slower than in other Crocodilians. M. V. Subba Rao (1981) states that the sex of gharial may be distinguished by cloacal probing if a minimum limit of 75 cm for total body length is observed while sexing gharial. V. B. Singh (1979) has reported on the sex ratios of gharial observed in nature.

At the Gharial Rehabilitation Centre at Kukrail near Lucknow, sexing of juvenile

gharial hatched from eggs collected from the Chambal river and reared at the centre, was done by probing of the cloaca on animals upto 4 years of age. After initial difficulty in unambiguously distinguishing the sex of animals, it was observed that in relation to the total body length, gharial displayed discretely differential development of the sex organ. This paper describes the basis for sex distinction in cloacal probing of juvenile gharial and sex ratios determined in different age classes of captive raised juveniles. Production of different sexes in Crocodilians has been discussed in light of sex ratios of captive and wild populations reported for other Crocodilian species.

### METHODS

Probing of the cloaca and extrusion of the sex organ was done with the little finger of the right hand. Prior to probing the finger was neatly manicured and the hand of the examiner and the cloacal vent of the gharial was cleaned and freed of sand particles by washing with a solution of potassium permanganate. Vaseline was used in cases to facilitate probing. The sex organ which lies forward of the anterior extremity of the cloacal vent was located and extruded by the finger to reveal its floral tip for examination.

The sex of the animal was then distinguished on the basis of appearance of the sex organ